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ABSTRACT

At present, there are several obstacles to efficient information retrieval regarding the world's standards. There is no uniformity in subject classification, although most standards are classified by the Universal Decimal Classification (UDC); there are no international indexes to the subjects covered; foreign standards and superseded standards (sometimes needed for legal purposes) are generally unavailable at national standards institutions. The proposed Centre would (1) standardize the usage of UDC for standard classification by assigning approved and uniform UDC-numbers; (2) convert all data relating to the world's standards to machine-readable form (punched cards and magnetic tape) for information retrieval by subject, country, language, etc., and for exchange of data between information centres and users of standards; (3) store all current standards as hard copy and on microfiche; (4) store all superseded standards on microfiche only; (5) publish lists and indexes as well as polyglot subject dictionaries. Procedures for assignment and control of UDC-numbers are outlined and a tentative proposal for coding of data on 80-column cards is made. (Author)

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AN INTERNATIONAL CENTRE FOR STANDARDS DOCUMENTATION

PROPOSALS FOR STANDARDIZATION OF UDC USAGE AND THE MECHANIZED DOCUMENTATION OF INFORMATION ON STANDARDS

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CONTRIBUTIONS TO INFORMATION SCIENCE

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2. A computer-produced index to current scientific research in Israel, by B. Arbel, C. Keren and H. Parnes. 1968.

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AN INTERNATIONAL CENTRE FOR STANDARDS DOCUMENTATION

Proposals for Standardization of UDC Usage and the Mechanized Documentation of Information on Standards

By H. Wellisch, A.L.A.

Abstract

At present, there are several obstacles to efficient information retrieval regarding the world's standards. There is no uniformity in subject classification, although most standards are classified by the UDC; there are no international indexes to the subjects covered; foreign standards and superseded standards (sometimes needed for legal purposes) are generally unavailable at national standards institutions. The proposed Centre would i) standardize the usage of UDC for standard classification by assigning approved and uniform UDC-numbers; ii) convert all data relating to the world's standards to machine-readable form (punched cards and magnetic tape) for information retrieval by subject, country, language, etc., and for exchange of data between information centres and users of standards; iii) store all current standards as hard copy and on microfiche; iv) store all superseded standards on microfiche only; v) publish lists and indexes as well as polyglot subject dictionaries.

Procedures for assignment and control of UDC-numbers are outlined and a tentative proposal for coding of data on 80-column cards is made.

The Centre would initially handle standards issued by ISO members, but at a later stage also standards published by professional and commercial bodies. It would form a link in the envisaged World Science Information System.

1. Introduction

In large industralized countries, where standardization on a national scale dates back to the beginning of this century, thousands and sometimes tens of thousands of national standards have been published which cover a great range of requirements in science, industry and commerce, A manufacturer in one of these countries who intends to produce a certain commodity may turn to the published catalogue of national standards and be reasonably sure to find there one or more standards covering the manufacture, testing and performance requirements of the article he has in mind. If the article is to be produced mainly for the home market, he may also be sure that it will conform to local regulations and customer demands. Finding information on standards, in this case, is a simple matter of looking up the required subject in a book.

But things are seldom as simple as all that. To take our manufacturer in an industrialized country again: if he has to produce also for export, he will have to know the requirements of foreign countries as embodied in their national standards, which means looking through a number of national standard catalogues, each of which is arranged in a different manner and to a different degree of specificity of information. Finding the required subject demands a very good knowledge of the language in question, because it may appear under several synonyms in the index.

Turning now to the needs of a scientist, engineer or manufacturer in one of the countries where standardization covers only few subjects, and especially in the developing countries, where standardization is only in its beginnings or even non-existent, they are in constant need to know where in the world, if at all, appropriate standards on a certain subject may be found, and whether any of them is suitable for a certain purpose or should possibly be adapted to the special conditions and needs of the country.

An important step in the direction of easier retrieval of information in standards was made when the International Organization for standardization (ISO) recommended to its members to adopt the Universal Decimal Classification (UDC)[1], but so far no attempt has been made to use the system as the basis for a subject concordance to the world's standards. The reasons are i) the lack of uniformity in the assignment of UDC-numbers, and ii) the large amount of data to be handled which cannot be managed economically by manual methods such as simple card indexes.

The lack of unified information on the subject content of the world's standards is aggravated by the problem of physical unavailability. Each national standard institution keeps first of all a file of its

own standards. The larger institutions keep also copies of foreign standards, but most of them cannot afford to store full collections of these. Much less are they able to keep them in stock for immediate sale because of lack of storage space and the heavy financial burden involved. Thus, even when it has been ascertained that a certain foreign standard contains the desired information, it takes several weeks and sometimes even months to obtain it physically.

The situation is even worse regarding superseded standards. At present, no national standards institution is able to keep in stock superseded standards other than their own, mainly because of lack of storage space and the clerical work that would be involved. The importance of superseded standards is, however, considerable since many times data on manufactured products have to be checked for technical or legal purposes against the standards that were in force at the time when the product was made. When a product was manufactured according to a foreign standard, it is difficult and time-consuming to obtain the necessary data.

2. An International Centre for Standards Documentation

The problems outlined above could be solved by the establishment of an International Centre for Standards Documentation (in the following simply called "Centre"). The technical difficulties could be overcome by central control of classification, the use of electronic data processing and by modern reprographic methods.

In fact, few bodies of information would lend themselves so well to the application of modern documentation methods.

a) Since the majority of the world's national standards are already classified by UDC, an international and polyglot system, the only thing required to achieve a common data base is standardization of usage by a central authority.

b) The number of individual standards issued by all ISO members is estimated to be somewhere in the vicinity of 200,000. Standards issued by other bodies would propably add no more than 50 to 100,000 at the most. This body of information units (in itself quite small as far as modern data processing equipment is concerned) remains fairly stable. Even large standards institutions do not issue more than a few hundred new standards per year, the bulk of their activity being devoted to the updating or revision of existing standards. This is maybe one of the few instances where an active body of information is not growing at an alarming rate and where automated data processing would not necessitate investments in huge installations.

c) The use of microphotography and cheap reproduction processes for the provision of hard copy would solve the problem of provision of foreign standards and superseded standards anywhere in the world.

In the following sections, the problems are analyzed in more detail and some solutions are proposed.

3. Classiffcation

Almost all ISO member organizations assign UDC-numbers to their published standards. Ideally, this should achieve two objects: i) a high degree of uniformity in coding of subjects, and ii) easy retrieval of standards dealing with a certain subject, irrespective of the language in which the original standard has been published. In practice, however, the same subject is often expressed by a bewildering variety of UDC-numbers of varying specificity, complexity and exactness, thus obviating the achievement of these objects.

There are at least six causes for the large variety of UDC-numbers to be found on standards dealing essentially with the same subject:

a) A subject may be classified by more than one main UDC-number.

b) A subject classified by a main UDC-number may also be expressed by a combination of two or more other UDC-numbers and/or by one or more appended auxiliaries.

c) The same UDC-number may be given to different degrees of specificity.

d) A wrong UDC-number may have been assigned.

e) The number appearing on a standard may be a misprint.

f) Any combination of a) to e).

Let us analyze the causes for discrepancies in UDC-numbers in more detail, and indicate possible remedies.

In case a) we face one of the basic problems of classification. Almost any subject may be viewed from various angles and in different contexts, and different UDC-numbers have been assigned to some of these aspects. As an example, the seemingly simple subject of "Pipes" may be chosen:

Pipes: flow in	532.542
Pipes: conduits	621.643.2
Pipes: manufacture	621.774
Pipes: installation in buildings	696.11

These are only some of the numbers relating to pipes themselves, and there are some more for pipes as components in networks, in chemical apparatus, in structural work, etc. This multiplicity of numbers is not only inevitable in a hierarchical system, but it is extremely useful for detailed analysis of documents and their retrieval from the proper context. In the classing of standards, however, such multiplicity leads to confusion. A standard, especially one of the properties or on the testing methods of materials and products, is usually very specific and strict in its provisions. It is therefore relatively easy to decide on the main aspects to be expressed by UDC-numbers, and all standards on the same subject should bear the same approved classification mark, irrespective of their origin or language. The decision on an "approved" UDC-number for a certain subject would have to be made at the Centre and would have to be in the nature of an authoritative recommendation.

Case b) is essentially a specialized form of a). It should not be thought for a moment that the allocation of "simple" UDC-numbers is advocated here. Quite to the contrary, complex subjects must be expressed by compound UDC-numbers, each aspect also being retrievable separately, if needed. What must be avoided is the uncontrolled variety of UDC-numbers assigned by different standard institutions and the indiscriminate use of main numbers or auxiliaries or both at the same time. An example may make this clear. Four standards on "Welded steel pipes" from different countries, dealing essentially with the same subject and even containing almost identical data are at present classified in the following manner:

ASA B 36.1	Welded and seamless steel pipe 621.774.2/.3:669.14
B.S. 3601	Steel pipes and tubes for pressure purposes 621.643.2-186:669.14-462
DIN 1626	Geschweisste Stahlrohre 621.643.23:621.791
N 417	Naadlose stalen pijpen 621.643.23

ASA (now USAS) is the only one to class under "Pipe manufacture, seam-welded and seamless"; B.S. gives the general number for "Pipes" (but

not "Steel pipes") and specifies "Pressure" by the auxiliary -186. Both prefer to express the concept "Steel" by coloning to "Steel manufacture", B.S. going even so far as to append the auxiliary -462, indicating "hollow form, pipe". (Such a number, expressed in its proper terms, means: "Pipe conduits related to the manufacture of steel for the production of hollow, pipelike objects" and it is questionable whether B.S. 3601 is really devoted to that subject, since it is not a standard on the manufacture of steel, but on the strength, wall thickness and form of steel pipes manufactured by welding together steel sheets.) DIN gives both the full number for steel pipes and colons to "welding", while N (the Dutch standard) is content to assign the simple UDC-number for steel pipes.*

The result of all this is that these four standards on welded steel pipes will not be found together in a classified file, and some will even be separated from one another by numerous other entries. Anyone looking for all standards on welded steel pipes will have to pick them out from a long and sometimes incoherent list, irrespective whether this list has been compiled manually by copying a card file or by ADP equipment scanning relevant positions on magnetic tape or other media.

Case c). Not only should the UDC-number assigned to a certain standard be standardized as to its conceptual content, but it should also be standardized as to its minimum precision, expressed by a certain number of digits to be shown on all relevant standards. In most instances, the "approved" or standardized length of a UDC-number would conform to that given in the German "Handausgabe" and its equivalents in other languages (3, 4, 5), these being the editions which will be used most widely. As far as possible, numbers appearing only in the full tables should be avoided. The standardized number could, in certain cases, and at the discretion of the publishing institution, be elaborated by appending further digits or auxiliaries, but these would be optional. Technically, the Centre would indicate the standardized length of a UDC-number by printing a thin vertical stroke after the last "approved" digit (such a device could not be confounded with any of the regular UDC symbols and signs). A similar device is now in use at the Library of Congress to indicate segmentation of long Dewey numbers on their catalogue cards (6).

To revert to our example: the concept "Pipes" would be expressed by the standardized number 621.643.2. The number 621.643 would not be sufficient, since it means "Conduits" and contains also open channels, hoses,

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* This shows, incidentally, the urgent need for a separate classification device denoting materials, as advocated by me in an earlier paper (2).

fittings, etc. Conversely, the notation

621.643.412|.6 Welding neck flanges

would mean that these fittings must be denoted at least by 621.643.412 Flanges, but could be specified by adding further digits and/or auxiliaries.

The retrieval routines at the Centre would be geared only to the standardized length of notation, thus ensuring uniformity and retrievability of like and similar subjects.

Case d), a wrong UDC-number, may have its cause in the inexperience of a classifier or his being unfamiliar with the system and its application. Many classifiers, despite all warning words in introductions and guides to the UDC, have a quick look at the subject index and assign a number found there without checking the tables. Only appropriate training and at least several years' experience in classifying technical matter can remedy the situation, but even for the experienced classifier it would be a tremendous help if he could rely on a standardized UDC-number assigned to previous standards when faced with a new subject or a familiar subject in a new context. Standards are, after all, not compiled haphazardly or in a hurry, and even the latest developments in technology have usually reached the stage where an appropriate UDC-number can be found in the tables, when it comes to classifying a standard relating to that subject.

Case e) will happen as long as there are printers' apprentices and sleepy (or sloppy) proofreaders, but these mistakes will have to be detected by thorough control before keypunching, preferably by manual methods. Automatic checking of errors in UDC digits would probably need rather complicated programming.

All the foregoing arguments can be summarized thus:

> The UDC-number of a standard should be standardized as to its conceptual connotation, specificity, relation to other concepts and use of auxiliary numbers.

Such a standardization of usage could only be carried out at the Centre which would have the necessary authority to recommend approved UDC numbers and encourage their consistent use by all member organizations.

The standardization of UDC usage would also make the Centre one of the focal points for UDC revision and for updating of the schedules, at least in those fields of science and technology that are covered by the world's standards. It is safe to assume that the standardization process

would bring about a gradual elimination of superfluous numbers, illogical hierarchies and cross-classification which remained undetected; it would, on the other hand, act as a catalyst for the creation of numbers for new concepts and subjects. The fact that these new numbers would have to be used immediately in practical application, namely in classing standards dealing with those subjects, would ensure that they would fit into a logical context and avoid clashes with other numbers for the same subject in another context.

4. Procedures for assignment and control of UDC-numbers

In the following, a procedure for the assignment, control and final approval of UDC-numbers by the Centre is given in outline. The proposed procedures should not be seen as a definitive framework; only a few technical details have been sketched in, and the actual methods would have to be worked out by experts. (In order to avoid cumbersome language, the following proposal is given in the present tense, although the procedures described do not yet exist.)

The Centre maintains Six Master Files of data on magnetic tapes (or discs):

A) The Current Standards Master File

This contains all data pertaining to current standards, their amendments and revisions. It is continuously updated and revised as new standards are received and superseded standards are removed from the active file. It is the main source for all lists and indexes produced by the Centre.

B) The Superseded Standards Master File

As soon as a standard is superseded (partly or wholly) the relevant data are deleted from the Current Standards Master File and transcribed onto this File.

C) The General UDC Master File

This is the magnetic tape containing the full UDC tables in English, as prepared by the American Institute of Physics (7), suitably updated by new material taken from "Extensions and Corrections to the UDC".

D) The UDC Index File

This is a corresponding tape, containing the full English index to the tables.

E) The "approved" UDC Master File

F) The Standard Subjects Master File

The last two files contain only subjects actually dealt with by the Centre (i.e. at least one standard in its collection pertains to at least one subject listed) and their corresponding UDC-numbers as authorized by the Centre. Initially, file E has been derived from file C, while file F is based on the "Thesaurus of engineering and scientific terms" (8) which is also available in machine-readable form. The data in files E and F reflect the Centre's practice in authorizing UDC-numbers for certain subjects and the terminology used.

When a new item (a new standard, a revised edition of an existing standard or an amendment) is received by the Centre, it is first checked against the standards on file. If it bears identical date of issue and designation (issuing agency, standard number and title) it is considered to be a duplicate and no further action is taken.

If the designation is identical with one held in the files, but has been issued on a different date, the previous standard is checked against the new item. If the latter is an entirely new edition, the superseded standard is withdrawn from the file, its cards pulled from the card files and punched with the "superseded" code and date; the data of the superseded standard are merged into Master File B while Master File A is updated accordingly.

If the item is a partial revision or an amendment, appropriate cards are punched and the data merged into Master File A. The item itself is stored physically with the standard to which it pertains.

If the designation of the new item is different from anyone already stored, cards are punched for it and the standard itself is filed in the physical store (see below, para. 5). The cards are then checked against Master Files E and F.

First, the UDC-number is checked against Master File E. If the new standard has the "approved" UDC-number for that subject and if the subject terms conform to Master File F, all data for that standard are merged into Master File A.

If the UDC-number differs from one already approved by the Centre, the following possibilities are considered and proper action is taken:

i) The UDC-number conforms with the approved one, but is shorter (i.e. too general). Action: further digits are added, to make the number more specific.

ii) The UDC-number conforms with the approved one, but is longer or augmented by auxiliaries. Action: it is shortened to standard length.

iii) The UDC-number differs altogether from the approved one.
   a) both the approved number and the new number seem to be correct. A decision is made whether to assign only the approved UDC-number, or to accept also the alternative number and to review the Centre's practice in the light of the information contained in the new standard and the decision of the classifier of the issuing agency. This sort of feedback is very important for keeping the file of "approved" UDC-numbers always up to date and in accordance with the current technological practice and usage. When an additional UDC-number has been approved, it is added to Master File E. If necessary, the definition in the tables is made more specific or terminology is changed, and the proposal submitted to FID's Classification Department for publication in the usual way.

   b) the variant number is a misinterpretation, because of unclear or misleading terminology. Also in this case, the Centre will make a proposal for better definition, so as to avoid future mistakes by other classifiers. Also, the translation of the UDC tables from which the variant number was taken, is checked. Frequently, errors in the assignment of UDC-numbers are the result of inaccurate translations.

iv) A wrong number has been assigned, either by a) erroneous classification, or b) transposition of digits (printer's error). Action: the approved UDC-number is assigned.

After final allocation of approved UDC-numbers, new cards are punched and the data merged into Master File A.

If the check against Master File F (subjects) shows that the subject is already on file, the data are merged into Master File A. If the subject is not on file, Master File D (the Index to the UDC) is first searched for the new term and the corresponding UDC-number is examined. A search is also made in the "Thesaurus", which may reveal synonyms and broader terms. If there is a discrepancy between the terminology of the "The saurus" and the UDC-index, the Thesaurus term is generally preferred, because the terminology of the UDC-Index is older and therefore apt to be out of date. This procedure aims at uniformity of terminology in File F, the Standards Subject Master File. Since both the "Thesaurus" and the UDC-Index are available on magnetic tape, checking and matching of terms can be done from the outset without costly compilation of a master subject list and its subsequent conversion to machine-readable form.

If all checking procedures show that the subject is indeed a new one at the Centre, a subject term card is punched and the data merged into Master File F. The subject is then classified by a UDC-number, taken either directly from the new standard or, if this number does not conform to the Centre's policy, another UDC-number or combination of numbers is assigned to it, and the data are merged into Master File A.

In this manner, every new item received at the Centre is a source for constant updating, revision and control of both the subject file and the UDC file. At present direct checks can be made only in English and German, but most standards in other languages bear at least a heading in English which makes it possible to ascertain the subject and to verify the UDC-number. At the same time, the subject designation in the original language is recorded and matched with the approved UDC-number, thus forming a polyglot dictionary of subjects. Since it may be assumed that the issuing agencies know best how to express a subject in the language of their country, the UDC-centred polyglot dictionary will gradually become an authoritative source for technical translations and one of the Centre's most important publications.

5. Physical storage of standards

After the punching of the deck of cards for a standard (one card for each subject and corresponding UDC-number, as well as separate cards for amendments and revisions), the item is photographed on microfiche for future retrieval and indefinite storage and the standard itself is filed physically on shelves.

There are two storage files. One, the active file, contains only standards which are in force, either wholly or partly, in their original form (hard copy). When a standard is withdrawn or superseded wholly by a new standard, it is immediately removed from the active file and discarded. Future reference to it is possible by means of the second file, where every standard is kept in microfiche form for an indefinite period. With the help of a reader-printer, any page or even whole standards can be reproduced quickly, should this be necessary for technical or legal purposes. Copies of microfiche can be sent by first class air mail and it is thus possible to supply the information anywhere in the world within a few days and at very small expense. Since the procedure applies to superseded standards only, no question of copyright is involved. For hard copy of current standards, the regular price is charged, while microfiche is sold at a lower price. In both cases, the respective standard institutes are reimbursed.

6. Data processing

All data by which a standard can be identified or which relate to it

are punched on 80-column cards on fixed fields. In many instances one card will be sufficient for issuing agency, date, subject, UDC-number, etc. For standards dealing with several subjects or with compound subjects, additional cards are punched. This might seem to be a cumbersome or even antiquated procedure for input to a data-processing installation. The reason for proposing cards as input is that computerized data processing is necessary only at the Centre for control of the whole world's output of standards and the publication of combined and cumulated indexes and lists. The participating standards institutions are supplied with cards and can use these in at least three different ways:

a) as input for computerized data processing equipment, for conversion to magnetic tapes or discs and subsequent production of their own indexes and lists according to their special requirements.

b) as input for simpler data processing equipment (card collators, printers, etc.) which is relatively inexpensive, yet can produce most of the lists needed. Many standard institutions which cannot afford computers are thus able to handle data of their own standards as well as those of foreign standards which are important to them.

c) as simple card indexes, filed and operated manually. Each card has the standard designation, the issuing body and the UDC-number printed on its top. This makes it possible to file them according to these three categories. Moreover, the cards can be used as Peek-a-boo cards to find appropriate subjects, even without any additional equipment. Similar applications of IBM-cards to manual retrieval have been described for patent classification and chemical information systems (9, 10).

The use of punched cards as simple card indexes is not restricted to the standards institutions. The issuing bodies sell the cards together with the standards to users who can then build up their own documentation in a manner similar to that explained above: from simple, manually operated card indexes in small firms to the most sophisticated data processing in large enterprises, where the cards form the input to documentation systems and networks on different levels.

Explanation of the fields

The following is a detailed breakdown of standards data, the columns and fields alloted to them and the corresponding printout (see fig.1). Since certain types of data processing equipment, such as the IBM 402 accounting machine, are capable of printing letters only in the first 43 columns, the fields have been so arranged that data containing let-

ters or a combination of letters and figures are concentrated in the left half of the card.

Subject. (Columns 1-21) The approved subject heading is punched here. If the subject term has more than 22 letters, the over-shooting part is punched on one or more trailer cards. The same is done for standards relating to more than one subject, each of which requires also additional (and corresponding) UDC-numbers. Related terms and synonyms are not punched on cards, since they are readily available in the EJC Thesaurus.

Issuing body. (Columns 22-24) A 3-letter code, taken from the official abbreviation of the issuing body's name, such as BSI, DNA, ISI, MSZ, etc. or abbreviated from a longer acronym such as AFNOR which would become AFN, etc.

Country. (Columns 25-26) One or two letters, according to ISO/R 639.

Language. (Columns 27-28) The language of the standard is indicated by two letters, also according to ISO/R 639

Designation. (Columns 29-39) Letters and/or numbers as they appear on the standard.

Related standards. (Columns 40-50) The designation of all standards to which reference is made is recorded here. If there is reference to more than one standard, the data are punched in additional cards. Withdrawn standards are marked by an asterisk after the designation. On certain accounting machines, letters can be printed only in the first four columns of this field (40-43), but letters appear generally in the beginning of a designation and there are seldom more than 4; longer letter designations on related standards would have to be abbreviated. All following columns contain only figures or signs.

Dates. (Columns 51-56) Both current and superseded dates can be punched here, since they will always be different, and the current date is always of higher numerical value. Printout is programmed so that the current date is printed first, followed by the superceded date, if necessary.

Amendments, revisions, drafts. (Column 57) Denoted by signs, viz. + for an amendment, * for a revision and % for a draft.

UDC (Columns 58-74) 17 columns allow for rather long numbers, including auxiliaries. Columns are alloted also for the points between each three-figure group of UDC-numbers as well as for other signs such as colon (for which some other sign has to be substituted since it is not available on simpler accounting machines), hyphen, stroke, brackets, etc.

These cannot be programmed for printout in advance, since they may be added anywhere to a UDC-number, also after one or two digits. If a standard has more than one UDC-number, additional cards are punched for each one, repeating all other data. This makes it possible to retrieve any standard dealing with a certain subject alone or in combination with any other subject.

If a standard has been published by the issuing body with a UDC-number which does not conform to approved Centre practice, that number is also punched on a card together with all pertinent standard data, but marked by a special sign in column 57. This device makes it possible to print lists of standards showing both approved and non-approved UDC-numbers.

Price. (Columns 75-78) The currency is not specified, since the name of the country makes this obvious.

Sequencing code. (Columns 79-80)

Figure 2 shows a simulated printout in all columns for standards on the subject of "Alphabeting" (alphabeting filing rules).

Figure 3 is another simulated printout, giving all data for a certain British Standard, both current and superseded.

Title. The full title of a standard is punched on trailer cards. If the title is not in English, cards are also punched for an English translation. At the Centre, the title cards form part of the input data to be recorded on magnetic tape for printout in lists and indexes, but the card or the deck of cards containing all other data and supplied with a standard can be used also without the title cards, since a search for subjects (the most commonly sought data) results in a list of relevant standard designations. The exact titles of these can be readily found in the large national and international indexes and catalogues published by the Centre and the participating institutes.

7. Publications of the Centre

The data stored in the Centre's Master Files would form the basis for the compilation of the following publications, lists and indexes.

a) National standard catalogues

The publication of national catalogues of standards is at present a complicated and tedious business, and it is also very costly. Only a few countries publish adequate catalogues where standards may be found from every possible angle. The central provision of up-to-date input in the form of cards or tapes would make it possible for each ISO

member institution to publish its annual catalogue without delay. Also, these catalogues would appear in a standardized format and layout, thus greatly facilitating a search for different standards on a certain subject. (At present, the layout and arrangement of the various national catalogues has virtually to be learnt by heart by those who have to find standards from various sources, and valuable information is sometimes not found because of the intricacies of the catalogues that have to be searched.)

b) Country lists

These would combine the national catalogues mentioned under a) and data on standards issued in a certain country by bodies other than the national standards institutions, thus forming concordances to standards published in any one country.

Countries or organizations lacking the facilities for processing of punched cards or magnetic tape could order the printing of their catalogues and lists at the Centre which would do such work on a contract basis.

c) Subject lists

Lists of standards on any given subject or combination of subjects, arranged by

Issuing body
Country
Date
Language
Related standards
Validity as "official" standard

The lists of "Related standards" would be similar to a citation index in that all standards cited in a certain standard would be given, as well as all standards that cite a certain other standard.

d) Lists of amendments and revisions

These could be issued for each country or issuing body on a monthly or quarterly basis.

e) Lists of Official Standards

In some countries, certain standards are approved as "official" ones, achieving the status of laws and ordinances. Indexes to these Official Standards would be valuable for both legal and technical purposes.

f) Approved UDC tables

These would contain the UDC-numbers approved (or preferred) by the Centre, thus ensuring maximum uniformity in their application by standards institutions and other organizations. The tables would serve as a corollary to the official UDC tables which contain all numbers. The multiplicity of possible UDC-numbers which may be given to a certain subject according to different aspects and contexts (but sometimes also within the same field) often leads to widely different practices in classifying, which is undesirable in preclassification for publication. The Approved Tables would help to make the UDC a truly universal classification, not only in the sense that it comprises the universe of knowledge, but also in the sense of its being applied uniformly to the same subject, thus forming a viable meta-language for concepts expressed by a multitude of terms in different languages.

g) Polyglot technical and scientific glossaries

Translations of technical and scientific terms, taken from the titles of standards in different languages and related to the UDC-number of the relevant subject, would form multi-lingual glossaries and dictionaries, as outlined in section 4) above.

h) Statistical data on standards

Statistical data on all of the above-mentioned aspects of information and on any combination of its parts could easily be compiled and important conclusions be drawn for future publication policy for standards, desirability of compiling new standards or revision of existing standards in the light of new standards having been adopted elsewhere, etc.

8. Standards issued by professional or commercial bodies

The Centre would, in the first stage, process the data of all standards issued by ISO member organizations, i.e. in most cases the national standards institutions. There are, however, tens of thousands of standards issued throughout the world by professional bodies (such as ASTM, ASME and many others in the United States, the VDE in Germany, etc., to name only a few) which are to be considered as national standards to all intents and purposes, and part of which cover subjects not included in national standards because of their specialized nature. The Centre should therefore at a later stage include in its activities also all commercial and professional standards, so as to make it a truly focal point for information on any subject on which a standard has been issued somewhere.

Conclusion

The establishment of the proposed Centre would make it possible to retrieve information on any aspect of standardization anywhere in the world by promoting the standardized use of a universal classification and by the use of mechanized retrieval methods which ensure compatibility and interchangeability between standards institutions, information centres and users. The relatively limited amount of basic data to be handled, the existing common base of a universal classification and the close cooperation between ISO members are factors favourable to the establishment of the Centre, which would form an important link in the recently envisaged World Science Information System (11).

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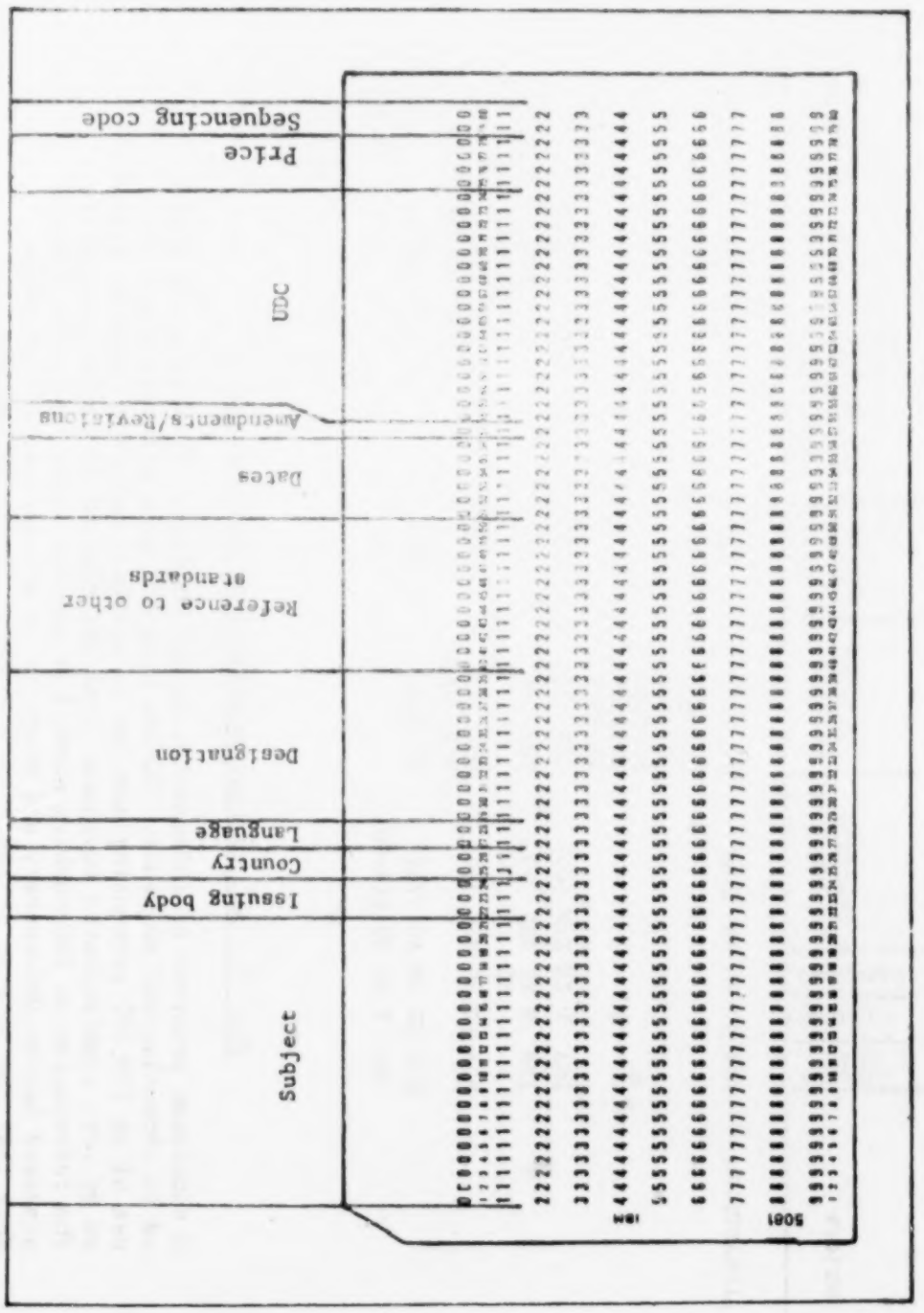

Fig. 1. An IBM card with labeled fields.

Subject	Issuing body	Country	Language	Standard designation	Related standards	Date of current standard	Date of supersed. standard	Amend./Rev.	UDC	Price
ALPHABETING	BSI	GB	EN	BS 3700	BS 1219 BS 1629 BS 1749 BS 1991 BS 2509 BS 2979	.64			001.815: 025.347	10.00
	DNA	D	DE	DIN 5007	DIN 1460	11.62	12.48	*	651.533.22	
	IBN	B	FR NL	NBN 399	NBN 245	.59			025.347: 651.533.22	150.00
	MSZ	H	HU	MSZ 3401	MSZ 3424 MSZ 3963	.58	.52	*	025.347: 651.533.22	4.50
	BSI	GB	EN	BS 1749	BS 1629	.51			025.347	2.00
	AFN	F	FR	NF Z44-001		.43				6.00

Fig. 2. All current standards on Alphabeting

A simulated printout of information in all columns. Standards are listed in chronological sequence. Titles have not been printed, since the use of an IBM 402 accounting machine is assumed, but they could be printed by more sophisticated equipment from information on additional cards. The information on UDC-numbers shows the present state (e.g. the French standard has no UDC-number, and there is no standardization of usage. Note that the Belgian standard is bi-lingual (French/Flemish).

Subject	Issuing body	Country	Language	Standard designation	Related standards	Date of current standard	Date of supersed. standard	Amend./Rev.	UDC	Price
REINFORCING STEEL	BSI	GB	EN	BS 785 PT1	BS 18 CP 114	.67	.38	*	666.982.2: 669.14-422	4.00
				BS 785 PT2	BS 18 BS 2691	.64	.38	*		4.00
				BS 785 PD5252		.06.64		+		
				BS 785 PD3676		08.02.60		+		
				BS 785 PD1320		01.52		+		
				BS 785 CG716		06.42		+		
				BS 785	BS 15		.36	*		
					BS 548*		.34	*		

Fig. 3. All data on B.S. 785 showing the evolution of this standard

The asterisk after the designation in column "Related standards" shows that this standard has been withdrawn.